

### REMARKS

In the Office Action, all of the pending claims, 1-38, were rejected. Herein, claims 2, 4, 8, 14 and 17 are cancelled, claims 1, 3, 7, 10-12, 16, 18-20, 24, 29, 33, 35 and 38 are amended, and new claims 39-43 are added. Please reconsider the application in view of the following remarks.

#### **A. Rejection of Claims under 35 USC 112, ¶ 2**

Claims 24-29 and 38 were rejected under 35 USC 112, ¶ 2 due to errors in antecedent basis. The claims are cancelled or amended to resolve the errors.

#### **B. Rejection of Claims over Korenaga et al.**

Claims 1, 3, 5, 12, and 13 were rejected under 35 USC 102(e) as anticipated by U.S. Pat. 6,314,228 to Korenaga et al. ("Korenaga") and claims 2, 4, 14, and 24-29 were rejected under 35 USC 103(a) as being obvious over Korenaga.

Regarding claims 1, claim 2 has been cancelled, and a feature similar to that of original of claim 2 has been added to claim 1. No new matter is added. Amended claim 1 is supported, for instance, by Figs 2 and 3 and the discussion thereof at pages 5 and 6 of the application.

It is submitted that amended claim 1 is allowable over Korenaga at least because of the following underlined claim features:

a substrate having a topographically patterned first surface, wherein said first surface includes at least one wall having a top and a bottom, and at least one intermediate step in the wall between the top and bottom; and

a conformal protective film provided over said first surface including over said wall and said at least one intermediate step, said film having a outer second surface, wherein said second surface forms a negative copy of the IOC to be molded using the

molding die, and said outer second surface is curved between the top and bottom of the wall of the substrate and over the at least one intermediate step.

Korenaga does not teach or suggest these cited features of amended claim 1. In particular, Korenaga only shows dies with square walls (Figs. 6(g) & 12(a)) or equilateral triangular walls (Fig. 2(a)). Korenaga mentions having a groove with a "section shape of a semicircle" (col. 7, lines 31-32), but does not show or discuss a die used to make a semicircular groove. Moreover, Korenaga does not show or teach how to make a die with a semicircular groove.

Korenaga does not, in particular, show the tool of claim 1, which achieves a curved outer surface through the provision of "at least one intermediate step in the wall" that is covered with a protective layer so that the "outer second surface is curved between the top and bottom of the wall of the substrate and over the at least one intermediate step." Accordingly, it is submitted that claim 1 is allowable over Korenaga.

Regarding claim 12, the claim has been amended to include the feature of claim 14, which has been cancelled. Amended claim 12 includes features similar to those discussed above related to amended claim 1, and is submitted to be allowable over Korenaga for the same reasons stated above for claim 1.

Claim 13 depends on claim 12, and is submitted to be allowable for the same reasons as claim 12.

Regarding claim 24, the claim is amended to include the features of amended claim 1, and is submitted to be allowable for the same reasons stated above.

Claims 27-29 depend on claim 24, and are submitted to be allowable for the same reasons stated for claims 1 and 24.

Regarding claim 29, the claim is supported in the specification by, for instance, Fig. 6c. It is submitted that

Korenaga does not teach or suggest the features of claim 29, including the features of "an optically transmissive surface layer for transmitting optical signals that is pressed to and an optical confinement layer located beneath said surface layer, said confinement layer having an index of refraction that is less than that of said surface layer." By contrast, Korenaga presses his glass substrate 21, not his core portion 23a that transmits his optical signals. Accordingly, claim 29 should be allowed.

**C. Rejection of Claims over Korenaga and Heming et al.**

Claims 6-11, 15-23, and 30-34 were rejected under 35 USC 103 as obvious over Korenaga and U.S. Patent 5,369,722 to Heming et al. ("Heming").

Regarding claim 6, the rejection is traversed, on grounds that a *prima facie* case of obviousness has not been made. Heming mentions roller-type embossing of synthetic resin films. Col. 11, line 29 *et seq.* The embossed synthetic resin films are then coated with inorganic waveguide material using plasma or ion deposition techniques. Col. 6, lines 16 *et seq.* The resulting product is a diffraction grating for an optical sensor.

A first reason why a *prima facie* case of obviousness has not been made is that a person of ordinary skill in the art would not combine Korenaga with Heming because Korenaga is making a different product than Heming, namely "an optical waveguide patterned in a manner like and electric circuit." Korenaga, col. 1, line 20-23.

A second reason why a *prima facie* case of obviousness has not been made is that the combination of Korenaga and Heming does not teach or suggest the feature of "applying said substrate onto the curved outer surface of the roller with said

second surface facing outwards." Heming's roller is not shown or described except in very general terms. Accordingly, it clearly is hindsight for the Examiner to assert that a person of ordinary skill in the art would apply "at least one" of Korenaga's die 20 to "the curved outer surface" of a roller. Korenaga's die 20 is used for simple vertical-direction pressing. See Fig. 2(a). It is not apparent to couple such a die 20 to a roller in view of Heming, when there is no express mention in Heming of anything concerning the structure of the roller. Moreover, Korenaga's die 20 is made of materials that are said to be "hardly deformed" and "high breaking strength." This suggests brittleness. Accordingly, a person of ordinary skill in the art would not make the leap to change from Korenaga's simple vertical-direction pressing (Fig. 2(a)) using such a hard die 20 to the attachment of the die 20 to a curve surface of a roller. Accordingly, the rejection of claim 6 as obvious is erroneous and must be withdrawn.

Regarding claim 8, the claim includes the further feature that the "substrate is bent to conform to the curved outer surface of the roller." This feature is not shown by either of Korenaga or Heming. Moreover, a person of ordinary skill in the art would not view this feature as being possible with Korenaga's die 20, because Korenaga's die 20 is merely used for vertical pressing, and is not constructed of materials that would appear to a person of ordinary skill to be capable of such bending. Rather, Korenaga's die 20 is made of materials asserted to be "hardly deformed" and "high breaking strength." Accordingly, the rejection of claim 8 is erroneous and must be withdrawn.

Regarding claim 15, and claims 10, 18, and 20, the rejections must be withdrawn for the same reasons stated above for claims 6 and 8, respectively.

Regarding claim 21, the rejection must be withdrawn because a *prima facie* case of obviousness has not been made. The claim includes the term "a semiconductor wafer." Korenaga does not disclose using a die formed of "semiconductor." Rather, Korenaga's die 20 is formed of "a hard alloy, zirconia, cermet, or silicon carbide."

Further, there is nothing in Korenaga to indicate that he is forming "a plurality of molding die" in a simultaneous process, as is claimed in claim 21, nor is there shown in Korenaga a step of "cutting" that singulates a plurality of molding die.

It is hindsight for the Examiner to conclude that a person of ordinary skill in the art is taught or motivated by Korenaga to perform the process of claim 21. Indeed, Korenaga states that his dies may be patterned by "machining." This suggests a process whereby his dies 20 are made individually. Accordingly, the rejection of claim 21 for obviousness is based on hindsight, and the rejection must be withdrawn.

Regarding claim 23, the claimed feature of "thinning said wafer" is not taught, suggested, or motivated by Korenaga. The Examiner does not even address this feature in his report, which suggests that the Examiner's reasoning is hindsight. Indeed, it is counterintuitive to thin the substrate of Korenaga's die 20, as is claimed in claim 23, because Korenaga stresses that the materials used for die 20 are "hardly deformed" and "high breaking strength." Presumably, thinning the die 20 would make it unsuitable for its purpose of press molding because the die 20 would be weakened. Accordingly, since not all features of claim 23 are in the cited references, and because the prior art does not teach or suggest the features of claim 23, the rejection must be withdrawn.

Regarding claim 30, the claim includes the features discussed above for claim 6, and is submitted to be allowable for the same reasons discussed above.

Regarding claim 33, the claim is supported by Fig. 6c similar to claim 29, and includes the feature of "an optically transmissive surface layer for transmitting optical signals that is pressed during said rolling and an optical confinement layer located beneath said surface layer, said confinement layer having an index of refraction that is less than that of said surface layer." Such a feature is not shown by Korenaga, who presses his glass substrate 21, not his core portions 23a that transmit his optical signals.

Regarding claim 34, the "bending" step is not taught or suggested by Korenaga, for the same reasons stated above for claim 8. Accordingly, claim 34 should be allowed.

The remaining claims are dependent.

**D. Rejection of Claims over Korenaga and Heming et al.**

Claims 35-38 were rejected as obvious over Korenaga and U.S. Patent 5,637,264 to Knapp et al. ("Knapp"). The claims are amended to include the features added to claim 1, which are discussed above with respect to claim 1. Accordingly, the new claims are submitted to be allowable.

**D. New Claims**

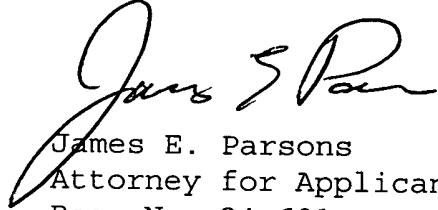
New claims 39-43 are added, without introducing new matter. Claims 39-41 include the features discussed above for claim 1, and are allowable for the same reasons stated above.

Claims 42 and 43 are supported by Fig. 6c, and the associated discussion thereof. Aspects of these claims are similar to those of claims 29 and 33, and are allowable for the reasons stated above with respect to claims 29 and 33.

**E. Conclusion**

Accordingly, it is submitted that the application is in a condition for allowance. Please direct any comments or questions to the undersigned at 408 451-5906.

Respectfully submitted,



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I hereby certify that this correspondence is being deposited with the United States Postal Service as FIRST CLASS MAIL in an envelope addressed to Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on January 12, 2004.

1/12/2004      Robert A. Baumark  
Date                      Signature